



The U.S. Environmental Protection Agency's **ENERGY STAR® Program** promotes the use of high-efficiency technologies and equipment. ENERGY STAR labeled homes use at least 30% less energy than homes built to meet the national Model Energy Code while maintaining or improving indoor air quality. These fact sheets are designed to help consumers learn more about the energy-efficient improvements to their ENERGY STAR labeled homes.

BALANCED VENTILATION SYSTEMS

MECHANICAL EQUIPMENT IMPROVEMENTS

The air within homes can become stale from moisture, odors, and pollutants that penetrate the home or are generated internally by human activity and out gassing from building materials and furnishings. A constant supply of fresh outdoor air can provide a greater assurance of good indoor air quality and improved comfort.

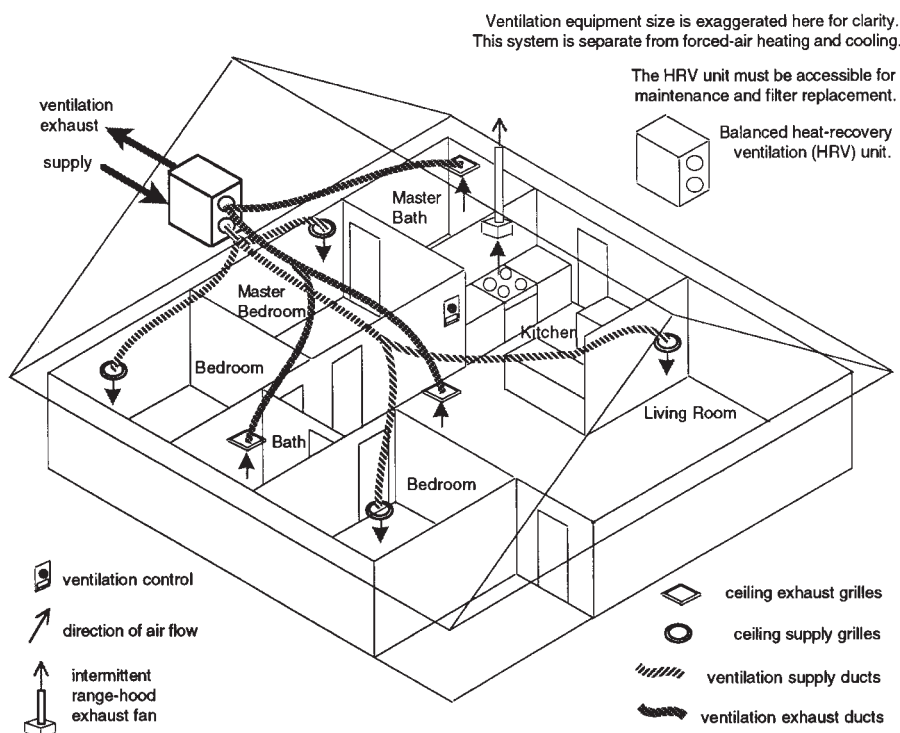
In most homes, ventilation is provided accidentally when air leaks through the building envelope. Accidental ventilation is unreliable because it is dependent on a pressure difference between indoor and outdoor spaces caused by temperature and wind variations. Too much fresh air often enters a house during cold weather causing uncomfortable drafts and high heating bills. Not enough fresh air may

enter during mild weather which can lead to poor indoor air quality.

Air leakage through the building envelope accounts for between 25 percent and 40 percent of the energy used for heating and cooling in a typical residence. Many new homes are being sealed to reduce this energy use. Where tighter construction reduces air leakage and accidental ventilation, active ventilation systems may be needed to provide fresh air.

Figure 1 shows how a balanced ventilation system works in a small home. Fresh air enters the home through a single intake and is then distributed through ducts to the living and sleeping areas. Stale air is removed from the home through a

FIGURE 1: BALANCED HEAT-RECOVERY VENTILATION (HRV) SCHEMATIC



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RESOURCES

The Consumer Guide to Home Energy Savings (Wilson and Morrill). Available from the American Council for an Energy Efficient Economy at 510-549-9914.

The following fact sheet is available by calling the U.S. Environmental Protection Agency's toll-free ENERGY STAR Hotline at 1-888-STAR-YES (1-888-782-7937): ***Air Sealing***.

Moisture Control in Homes fact sheet available from the Energy Efficiency and Renewable Energy Clearinghouse (EREC), P.O. Box 3048, Merrifield, VA 22116, 1-800-DOE-EREC (1-800-363-3732).

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separate exhaust duct with inlets typically located in the bathrooms. The kitchen has a separate, manually operated exhaust fan located in the range hood. These systems can operate continuously or only when homes are occupied. The supply and exhaust fans are equal in capacity to maintain indoor pressure balance.

In severe climates, balanced ventilation systems can be equipped with a heat exchanger that recovers most of the heating and cooling energy from the exhaust air. There are two types of heat exchangers: sensible and total. Sensible heat exchangers recover dry heat. They are well suited for cold climates and are becoming common in many parts of Canada and the northern United States. Total heat exchangers transfer heat and moisture for additional humidity control. They work well in both cold and moderately humid climates, and can help prevent moisture-related problems. Balanced ventilation systems can be used safely with all types of heating and cooling equipment, but are more expensive than other ventilation systems (exhaust and supply ventilation).

BENEFITS

Balanced ventilation systems can provide many benefits including:

Improved indoor air quality. Balanced ventilation systems supply fresh air to the living and sleeping areas of homes while exhausting stale air at an equal rate from the bathrooms. This proactive approach to ventilation can result in improved indoor air quality.

Improved comfort. ENERGY STAR labeled homes with tight construction and balanced ventilation systems can have fewer drafts and a constant supply of outdoor air resulting in improved comfort.

Improved health. Stale air can cause health problems. It can be responsible for symptoms such as headaches, drowsiness, and respiratory problems. These symptoms are more common in homes with poor ventilation and moisture control. Continuously providing fresh air can result in the improved health and well being of the occupants.

Lower utility bills. Less energy is consumed to operate ventilation systems than to heat and cool excessive amounts of outdoor air that infiltrates leaky homes. Additional savings are captured when these systems are equipped with either a sensible or total heat exchanger. This can result in lower utility bills, making homes less expensive to operate.

Improved resale position. ENERGY STAR labeled homes with balanced ventilation systems can provide the many impressive benefits listed including more comfortable homes with better indoor air quality and lower utility bills. These benefits can translate into higher resale value.